SSM -Population Health 2 (2016) 317–326

Contents lists available at ScienceDirect

SSM -Population Health

journal homepage: www.elsevier.com/locate/ssmph

Article

The relationship between relative deprivation and self-rated health among Palestinian women in refugee camps in Lebanon

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ARTICLE INFO

Article history:
Received 12 December 2015
Received in revised form
21 February 2016
Accepted 25 March 2016

Keywords:
Relative deprivation
Self-rated health
Palestinian refugees
Lebanon

ABSTRACT

Background: Relative deprivation (RD) has been advanced as a theory to explain the relationship between income inequality and health in high-income countries. In this study, we tested the theory in a low-income protracted refugee setting in a middle-income country.
Methods: Using data from the 2010 Socioeconomic Survey of Palestine Refugees in Lebanon, we examined the relationship between RD and health among a representative sample of Palestinian refugee women ($N=1047$). Data were gathered utilizing a household questionnaire with information on socio-demographics and an individual-level questionnaire with information on the health of each respondent. We examined self-rated health (SRH) as the main health measure but also checked the sensitivity of our results using self-reported chronic conditions. We used two measures for absolute SES: total household monthly expenditures on non-food goods and services and total household monthly expenditures on non-health goods and services. With refugee camp as a reference group, we measured a household's RD as a household's rank of absolute SES within the reference group, multiplied by the distance between its absolute SES and the average absolute SES of all households ranked above it. We investigated the robustness of the RD–SRH relationship using these two alternative measures of absolute SES.
Results: Our findings show that, controlling for absolute SES and other possible confounders, women report significantly poorer health when they live in households with a higher score on our RD measure (because of either lower relative rank or lower relative SES compared to households better off in the reference group which we take to be the refugee camp). While RD is always significant as a determinant of SRH under a variety of specifications, absolute SES is not consistently significant. These findings persist when we use self-reported chronic conditions as our measure of health instead of SRH, suggesting that the relationship between health and RD may be operating through a psychosocial mechanism.
Discussion: Our findings underscore the importance of examining RD under conditions of poverty and in diverse socio-cultural contexts. They also highlight that public health approaches should be concerned with reducing social inequalities in low-income settings in addition to alleviating poverty.
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Background

Epidemiological studies have shown a consistent and strong association between absolute socioeconomic status (SES), measured by occupation, education, expenditures, or income, and health. Furthermore, considerable evidence has shown that health is also determined by the distribution of socioeconomic resources in an individual's context (Wilkinson & Pickett, 2006, 2007). In high-income settings, where basic material needs are satisfied and absolute income is above a certain threshold, health is associated with inequality as well as poverty (Deaton, 2003; Kawachi & Kennedy, 1999; Lynch & Kaplan, 1997).

Income inequality links with health through a number of macro- and micro-level pathways. At the macro-level, income inequality is purported to lead to under-investments in public goods and services (Kawachi & Kennedy, 1999; Lynch & Kaplan, 1997). With increasing inequality, the interests of the more powerful and well-off classes – i.e., lowering taxes and reducing social spending – translate into under-investments in public goods and services and lower opportunities for the poor. Income inequality may also affect health negatively through the erosion of social cohesion and trust in a society. Kawachi and Kennedy found that states in the United States (U.S.) with higher income inequality

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http://dx.doi.org/10.1016/j.ssmph.2016.03.008
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exhibit lower trust and volunteerism, and lower self-reported health status (Kawachi & Kennedy, 1997).

Income inequality also exerts an effect on health through an individual-level psychosocial mechanism, of which relative deprivation (RD) is one explanatory variable (Kawachi & Kennedy, 1999, 2006). When individuals compare themselves to those positioned higher on the social hierarchy, feelings of RD ensue and activate stress mechanisms that negatively affect health. Thus, RD belongs to the family of psychosocial theories and advances that inequalities cause repeated exposures to stress that exerts wear and tear on metabolic, cardiovascular, and immune systems, thereby increasing susceptibility to illness (Deaton, 2001; Krieger, 2001; Marmot & Wilkinson, 2001). Supporting evidence for RD comes from research on primates that has shown an association between rank, stress, and mortality (Deaton, 2001). Early epidemiological evidence on the RD psychosocial pathway is based primarily on studies in high-income settings (Runciman, 1967; Townsend, 1979; Walker & Smith, 2002).

Empirically, RD is operationalized as a function of both absolute SES and a measure of the distribution of SES in the reference group (Wagstaff & van Doorslaer, 2000). There is no consensus, however, on what constitutes a reference and researchers have generally used the average SES in a demographic or geographic group as a reference (Yngwe, Fritzell, Lundberg, Diderichsen, & Burström, 2003). In some cases, researchers conduct a set of analyses using different reference groups and test which one provides the strongest association with poor health (Kondo, Kawachi, Subramanian, Takeda, & Yamagata, 2008).

Studies examining the link between income inequality and health, for which RD is one explanatory pathway, have shown mixed results. Whereas U.S.-based studies utilizing self-rated health (SRH) as the outcome measure provided supportive evidence (Kennedy, Kawachi, Glass, & Prothrow-Stith, 1998; Subramanyam, Kawachi, Berkman, & Subramanian, 2009), initial findings from European studies focusing on other health measures (i.e., mortality) did not (Mackenbach, 2002; Osler et al., 2002). On the one hand, the null findings in Europe suggest that the relationship between income inequality and mortality may be specific to the highly unequal context in the U.S., purportedly because European welfare benefits buffer the negative effects of income inequality on health. On the other hand, the divergent findings may be due to the nature of the health outcome itself, as subjective health may be more sensitive to inequality than an objective health measure such as mortality. In more recent cross-country analyses of European data, income inequality was found to weakly predict poor SRH in general, though the association was relatively strong in Eastern European countries due to causes of death related to smoking and alcohol use (Mackenbach et al., 2008). In Western Europe (i.e., the United Kingdom), absolute income remained more strongly predictive of SRH even after the inclusion of measures of RD (Jones & Wildman, 2008).

Only a handful of studies examined the RD-health association outside the U.S. and Europe; all revealed strong evidence that, above and beyond absolute income, RD is an important predictor. In research using a large probability sample of Japanese men and women, RD measured by the Yitzhaki Index was found to associate with poor SRH independently of absolute income (Kondo et al., 2008). Further, a study based on a nationally representative cohort of Costa Rican individuals aged 30 and over found a positive association between RD, measured by area-level Gini Coefficients, and mortality. Modrek, Dow, and Rosero-Bixby (2012) In South Africa, research linking income and mortality data between 1993 and 1998 has shown that multiple measures of RD significantly predicted mortality after adjustment for absolute income (Salti, 2010). Finally, research linking RD to adult nutritional status in rural Zambia found that a lower subjective perception of SES is associated with a significantly lower body mass index (Cole, 2012). The results of these studies combined suggest that RD is an important predictor of health, sometimes independent of absolute income, outside the context of the U.S. and Europe.

RD presumably operates in societies where material living standards are adequate but where social inequalities exist. The theory has rarely been tested in low-income contexts despite accumulating evidence that income inequality is widening globally and threatening to block efforts to reduce poverty. As the detrimental effects of RD on health co-exist with the effects of poverty, it no longer suffices to promote poverty reduction alone as a policy to improve health. Reducing income inequality then is an important social policy approach to population health.

In this paper, we investigated RD as a pathway between income inequality and health in the low-income setting of Palestinian refugee camps in Lebanon. We examined self-rated health (SRH) as the main health measure but also checked the sensitivity of our results using self-reported chronic conditions. With the exception of a few studies investigating the pathways between social inequalities and health among Palestinians in Israel (Daoud, Soklone, & Manor, 2009a, 2009b), very few have specifically examined social inequalities within Palestinian refugee communities. Though the World Bank classifies Lebanon as an upper middle-income country, Palestinian refugee camps on Lebanese territory constitute pockets of poverty (Ramadan, 2013). Palestinians arrived to Lebanon as refugees in 1948 after the creation of the State of Israel; they currently number 450,000 according to the records of the United Nations Relief and Works Agency, UNRWA (UNRWA, 2013). For more than six decades, they have faced exclusionary policies that restrict their employment, property ownership, and other civil rights (Abdulrahim & Khawaja, 2011; Chaaban et al., 2010). More than 50 percent of Palestinians in Lebanon reside in twelve recognized refugee camps under conditions of poverty and overcrowding; the rest reside in “unofficial gatherings”, some of which have worse infrastructure than official camps.

UNRWA’s mandate is the provision of education, health care services, and relief to Palestinian refugees, but not legal protections, which are usually provided by the United Nations High Commissioner for Refugees (Knudsen, 2009). Palestinian refugees in Lebanon exhibit a low rate of secondary school completion and are banned from participating in syndicated professions such as engineering, law, and nursing. As such, most Palestinians are economically and spatially segregated from the rest of Lebanese society; those who work do so in the informal labor sector and half earn less than the Lebanese minimum wage (Garrity, Somes, & Marx, 1978). Palestinian women experience more disadvantage than Palestinian men due to the intersection of gender and ethnic exclusion; women who work are primarily segregated in jobs inside the camp and earn lower wages compared to men (Abdulrahim & Khawaja, 2011).

In this context of segregation, RD deserves examination as a potential explanation for health inequalities within the Palestinian refugee community in Lebanon. Moreover, as Palestinian refugees have universal access to primary health care through UNRWA’s clinics, they present a unique case for testing the RD theory, which proposes that the social inequality-health relationship cannot be explained by differential access to health care. Utilizing data gathered in 2010, we examined the relationship between the health of Palestinian women residing in refugee camps and two alternative measures of RD, each calculated using a different proxy measure of absolute SES (household non-health expenditures per capita, and household non-food expenditures per capita), with camp of residence as the reference group. To investigate the contribution of RD as a determinant of health, we added a measure of RD to standard determinants of health, which include age, chronic conditions (Garrity et al., 1978), household size (Wu & Li, 2012),

education (Lleras-Muney & Cutler, 2008), and absolute SES (Lleras-Muney, Cutler, & Vogl, 2011). Whereas our main measure of health is SRH, we also examined the robustness of our findings on the relationship between RD and health by examining self-reported chronic conditions as another health outcome.

Methods

Data

We used data from the UNRWA-American University of Beirut (UNRWA-AUB) Socioeconomic Survey of Palestine Refugees in Lebanon (2010). The survey was based on a nationally representative sample of all Palestinian refugee households registered with UNRWA, both in refugee camps and in settlements outside the camps. Data were gathered using two questionnaires: (1) a household-level questionnaire, with information on the socioeconomic status, the demographic composition, the area of residence of the household and the physical condition of the dwelling and (2) an individual-level questionnaire, with information on the respondent's demographic and labor market profile, in addition to their SRH and any chronic conditions they suffer from.

Because most of the respondents to the individual-level questionnaire were women, and because health outcomes, including SRH and chronic conditions, may be different across genders, we restricted our study to women. We also restricted our sample to households residing in refugee camps; $N=1049$ women living in 12 refugee camps. Summary statistics for the entire sample are presented in Table 1 and for each individual camp in the appendix tables. We also report a correlation matrix of our various measures of absolute and relative SES in the appendix.

Runciman (1967) defined the degree of deprivation inherent in not having a particular level of SES as an increasing function of the proportion of individuals in a reference group that have that level of SES (or more). Our measure of RD is the simplest quantification of this definition that would be sensitive to not only the proportion of society with higher SES than an individual's, but also to the magnitude of the difference between an individual's standing and the SES of those better off than they are.

Yitzhaki's (1979) was the first operationalization in the economics literature of Runciman's RD index. He proposed a simple quantification of Runciman's definition: any SES above an individual's socioeconomic standing is associated with an inherent degree of deprivation, computed as the proportion of people who have that SES (or more); an individual's relative deprivation is measured as the sum of the deprivation inherent in all units of SES of which an individual is deprived, so the sum of these proportions for all levels above the individual's SES.

In the case at hand, our RD measure is based on the distribution of the SES of households in the camp of residence. So if $F(.)$ is the cumulative probability density function of household SES in a given refugee camp, and x^T is the highest SES, for an individual in a household with SES x, the measure of RD is the relative weight of all households with SES above x:

$$Y(x) = \int_x^{x^T} (1-F(y))dy \tag{1}$$

The measure of RD we adopt is based on Deaton's variation of the Yitzhaki index (Krieger, 2001). One of the limitations of the RD index in (1) is that it is not sensitive to increases in deprivation that would result from an increase in the SES of people above an individual's standing. In order to remedy that, we scale the index in (1) to the average SES μ within the reference group, as Deaton does. We do this for two reasons:

i. the measure of RD becomes unit free:

$$Rdep(x) = \frac{\int_x^{x^T} (1-F(y))dy}{\mu} \tag{2}$$

ii. the scaling allows a useful reformulation of Deaton's RD index:

$$Rdep(x) = (1-F(x))\frac{\mu^+(x)-x}{\mu} \tag{3}$$

where $\mu^+(x)$ is the average SES above x. This reformulation shows that RD of a household depends on the fraction of households above the household in question in the distribution of spending (so households with higher SES, $1-F(x)$), but also on the average size of the difference in SES between these households and the household in question $\mu^+(x)-x$.

Measures

Independent variables

While the survey includes a question on household income, there is both a very high non-response rate on this question as there is a general reluctance to answer income-related questions in low-income settings (Lleras-Muney and Cutler, 2008). There is also good reason to believe that, in low-income settings, income data may exhibit a great deal of error (Lleras-Muney et al., 2011). Consumption data as calculated by the sum of household monthly expenditures tends to be recorded with less measurement error than income, because of lower recall error, and lower rates of refusal to answer. Further, in the absence of reliable income data, it has been standard practice to use consumption data as indicative of a household's SES (Wilks et al., 2007). There is consensus among development economists on consumption expenditures being a more reliable measure of SES than income in lower- and middle-income settings (Howe et al., 2012; Deaton, 1992; Deaton & Zaidi, 1998). In the case of refugee populations, a study on Iraqi refugees in Syria and Jordan showed that income and consumption expenditures can be used interchangeably as measures of SES (Cole, Doocy, Frattarolli, & McGready, 2012).

In multivariate analyses, we used two alternative measures of SES based on expenditures: household non-health expenditures per capita, and household non-food expenditures per capita. In the first measure of SES, we excluded health expenditures as out-of-pocket payments on health affect household expenditures as a measure of SES: health expenditures could drive up total household expenditures while eroding SES. Our second measure is

Table 1
Summary statistics.

	Mean	Standard deviation	Number of observations
Self-rated health[a] (1: very good–5: very bad)	2.91	0.95	1047
Chronic conditions[a]	0.51	0.50	1047
Age[a]	51.72	15.43	1049
Education[a]	3.56	2.16	1049
Household size[b]	4.47	2.14	1049
Asset index[b]	2.06	0.60	1041
Household exp/cap[b]	234.92	153.96	1049
Non-health exp/cap[b]	213.17	134.72	1049
Non-food exp/cap[b]	172.82	153.96	1025
Relative deprivation[b] (non-health exp)	0.35	0.24	1040
Relative deprivation[b] (non-food exp)	0.41	0.29	1,040

[a] Respondent-level variable.
[b] Household-level variable.

commonly used in the literature and focuses on non-food consumption as the measure more closely indicative of a household's SES. We calculated relative deprivation according to (3) above for each of these SES measures, with camp of residence as the reference group. In order to identify whether the association measured between RD and SRH is explained away through physical health, we included in some of the multivariate analyses chronic conditions as a covariate to control for its possible confounding effect and check whether the association between RD and SRH persists even when chronic conditions are held constant.

Dependent variables

Our main health outcome measure is SRH. SRH is a widely used subjective summary of an individual's physical, social, and psychological health, and has been shown to predict future morbidity and mortality (Idler & Benyamini, 1997). It was assessed through a one-item measure in the questionnaire in which participants were asked: "How do you describe your current health status?" and provided five response options that ranged from "very good" to "not good at all." SRH was included in the analysis as a linear measure in some of the regressions, thus preserving all the information contained in the variable.

In some of the regressions, SRH was also recoded as a dichotomous variable in regressions with different functional forms, with "very good," "good," and "fair" coded as "good health" versus "not good," and "not good at all" coded as bad health. This recoding may help to reduce some of the measurement error inherent in a 5-point subjective scale.

In one specification in our sensitivity analysis, we used chronic conditions as the measure of health instead of SRH. Chronic conditions is self-reported and dichotomous, taking the value 1 if the respondent reports having any chronic condition. This alternative measure of health is used to check whether the significance and direction of the findings obtained with SRH change when health is measured differently.

Covariates

We controlled for covariates at the individual (age and education); household (household size, household SES as measured by total household non-health expenditures per capita and household non-food expenditures per capita, and a household index of asset ownership) and camp levels (camp of residence).

Analysis

Using the RD measure described above, we ran a series of regressions to test the association between RD and SRH, adjusting for age, education, household size, camp, and household SES.

Our baseline regressions take the form:

$$SRH = g(RD,\ \text{nonhealth exp}, Z) + \varepsilon \tag{4}$$

where Z is a vector of control variables including age, age squared, education, household size, and camp fixed effects and ε is a random disturbance term. We run a set of linear regressions using Ordinary Least Squares (OLS), with SRH measured as a scale going from 1 ("very bad") to 5 ("very good") on our sample of 1049 female respondents residing in camps. These basic controls are included in every regression that we run as they are determinants of health. We also include these variables to make sure they are not confounding our measure of the marginal associations between health and SES and relative deprivation as some of these variables are likely correlated to SES.

Results

Main findings

Table 2 reports the results from running regressions of health on absolute SES and relative deprivation and other socio-demographic determinants of health.

A linear version of the baseline regression in Eq. (4) is run using OLS in columns (1) through (4) of Table 2 with SRH as the measure of the health outcome. Column (1) includes the control variables listed in Eq. (4). RD shows a significant negative association with SRH: holding fixed the household's absolute SES (as measured by non-health expenditures), a larger RD index for the household is associated with a significantly lower SRH for the respondent. An increase in the RD index by 0.5 is associated with a score on the SRH scale on average 0.27 (95% CI: [0.01–0.5]) points lower.

The remainder of the regressions reported in Table 2 are extensions and variations of the baseline regression in column (1) that attempt to rule out alternative hypotheses and to ascertain the pathway through which inequality may affect health.

Column (2) adds to the control variables in column (1) an indicator of the respondent's report of having one or more chronic conditions. Chronic conditions is added to the model in order to try to determine whether there is a psychosocial aspect to the relationship between relative deprivation and health: when chronic conditions are included as a control variable, the resulting coefficient on relative deprivation shows the association between relative deprivation and SRH holding chronic conditions fixed. Such variation in SRH is capturing differences in self-assessed health status beyond what is warranted by differences in SRH due to chronic conditions. While the chronic conditions variable turns out to be a significant and negative determinant of SRH, it does not affect the results on the basic relation between RD and SRH. RD still has a significant and negative coefficient, of only slightly lower in magnitude than in column (1): now a 0.5 increase in the relative deprivation index is associated with a score on SRH that is 0.23 (95% CI: [0.02–0.49]) lower.

To address the concern that household non-health expenditures are variable over time, and fluctuate more than the household's actual SES, we added an index of asset ownership in the household to control for SES, since the ownership of durables is less variable over time. Column (3) shows that the assets ownership index appears to be a highly significant determinant of SRH, but it does not affect the relationship between RD and SRH: RD is still a significant health hazard with a 0.5 increase in RD associated with SRH that is lower by 0.27 (95% CI: [0.01–0.5]).

Because expenditures on health compared across households may also contribute to a sense of deprivation, we also calculated the RD index over total household non-food expenditures per capita (including health expenditures). In column (4), we show the regression in column (2) with the RD index calculated over non-food expenditures. The results are qualitatively similar to the main findings described in the previous columns. They show that RD remains detrimental to SRH (a 0.5 increase in the RD index is associated with a score 0.12 (95% CI: [0.03–0.21]) lower on SRH), and significantly so.

In the next two columns of Table 2, we investigated the relationships we found in columns (3) and (4), but using a binary measure of SRH (fair, good and very good versus poor and very poor). This pair of regressions is included in order to avoid some of the measurement problems with a 5-point scale measure of SRH, as well as to make sure the results obtained in the first (4) columns are not driven by our choice of functional form (OLS). We ran a logistic regression of a binary measure of SRH in column (5), using the same regressors as in column (3); the results in the column (5) show that RD (over non-health expenditures) is a significant

Table 2
Regressions of health on relative deprivation and controls.

Dependent variable:	SRH										chronic cond
	(1) OLS	(2) OLS	(3) OLS	(4) OLS	(5) Logistic[a]	(6) Logistic[a]	(7) OLS	(8) OLS	(9) OLS	(10) OLS	(11) Logistic[b]
Relative deprivation (non-health)	−0.55* (0.26)	−0.47+ (0.26)	−0.54* (0.26)		−1.5* (0.75)		−0.79** (0.19)		−0.74** (0.20)		1.18* (0.56)
Relative deprivation (non-food)				−0.24** (0.09)		−0.71* (0.28)		−0.23* (0.09)		−0.23* (0.09)	
Non-health expenditures	-8×10^{4} (5×10^{-4})	-6×10^{-4} (5×10^{-4})	-7×10^{-4} (5×10^{-4})	4×10^{-5} (3×10^{-4})	-2×10^{-3} (1.5×10^{-3})	4×10^{-4} (7×10^{-4})					
Total expenditures							$-1\times10^{-4**}$ (3×10^{-4})	-2×10^{-4} (2×10^{-4})			
Non-food expenditures									$-1\times10^{-3**}$ (4×10^{-4})	$4\times10^{-4+}$ (2×10^{-4})	$4\times10^{-4**}$ (1×10^{-4})
Assets index			0.13** (0.05)		0.39* (0.15)	0.33* (0.15)	0.14** (0.05)	0.11* (0.05)	0.14** (0.05)	0.12* (0.05)	−0.12 (0.13)
Chronic conditions[c]		−0.54** (0.06)	−0.54** (0.06)	−0.55** (0.06)	−1.03** (0.18)	−1.06** (0.18)	−0.52** (0.06)	−0.55** (0.06)	−0.54** (0.06)	−0.57** (0.06)	
R^2	0.18	0.24	0.25	0.25			0.25	0.25	0.26	0.25	
n	1038	1036	1029	1036	1031	1031	1029	1029	1006	1006	1008

Note: "+" significant at the 10% level,
Logistic regressions in columns (5), (6) and (11) report β (logistic coefficients).
All regressions control for age and age squared, education, household size and the camp of residence. All expenditures variables are scaled by household size.
* Significant at the 5% level.
** Significant at the 1% level. Standard errors in parentheses.
[a] Binary dependent variable=1 for good self-rated health, 0 for poor self rated health.
[b] Binary dependent variable=1 for the presence of chronic conditions, 0 for the absence of chronic conditions.
[c] Excluded category: respondent reports no chronic conditions.

health hazard: an increase in the RD index by 0.5 is associated with a 0.75 (95% CI: [0.01–1.5]) lower log odds of reporting good or fair health. In column (6), we ran a similar regression with our alternative measure of SES. The results show that increasing RD over non-food expenditures by 0.5 is associated with a 0.36 (95% CI: [0.08–0.6]) lower log odds of reporting good or fair health.

Robustness checks

The remainder of Table 2 reports the results from the robustness checks that we run on our findings. In this section, we check the sensitivity of our results to alternative measures of absolute SES. We use, in turn, two measures of absolute SES instead of non-health expenditures: total per capita expenditures and non-food expenditures per capita. In the last column, we also vary our health outcome measure and use self-reported presence of a chronic condition rather than SRH.

The significant association between RD and SRH is robust to using total household expenditures per capita to control for household SES. All of the results for RD are qualitatively unchanged when household non-health expenditures per capita is replaced with household total expenditures per capita. Column (7) shows the results from an OLS regression of SRH on RD controlling for the presence of any chronic conditions, total household expenditures and the assets index. The coefficient on RD remains significant and deleterious for health: an increase of RD by 0.5 is associated with SRH lower by 0.4 (95% CI: [0.2–0.6]).

We used total household expenditures per capita as our measure of absolute household SES in column (8), but calculated the RD index over non-food expenditures. Using the same controls as in the previous column, we find that an increase in the RD index by 0.5 is associated with a score on SRH that is lower by 0.11 (95% CI: [0.02–0.2]).

The next pair of regressions used non-food expenditures per capita as the measure of absolute SES instead of total expenditures. Column (9) shows the results for RD over non-health expenditures, whereas column (10) shows the results for non-food expenditures. Both regressions controlled for the same covariates. The results are qualitatively similar to using total or non-health expenditures as the measure of SES: RD is a significant predictor of SRH, even when we control for absolute household SES. Increasing non-health RD by 0.5 is associated with an SRH index that's lower by 0.37 (95% CI: [0.18–0.55]), whereas increasing RD in non-food expenditures by 0.5 is associated with SRH that is lower by 0.11 (95% CI: [0.02–0.2]).

Column (11) reports the results from repeating the regression in column (9) but using the self-reported presence of any chronic conditions as the health outcome instead of SRH: when controlling for non-food expenditures, RD over non-health expenditures is associated with a significantly higher risk of reporting a chronic condition: an increase in RD by 0.5 means an 0.55 increase in the log odds of reporting a chronic condition (95% CI: [0.03–1.15]).

It should also be noted that every regression reported in Table 2 with the 5-scale SRH variable as a dependent variable was also run as an ordered-probit regression rather than a linear regression. We do not report these results by individual regression here, but in every case, the sign and significance of the coefficient on the relative deprivation index was unchanged by the change in the estimation procedure.

Finally, the specifications in Table 2 were repeated using multilevel analysis with camp as the level of aggregation. Whether maximum likelihood or restricted estimation maximum likelihood was used, the estimation did not converge. Using expected maximization, the results obtained consistently failed the likelihood ratio test comparing them to the fixed-coefficient linear models reported in Table 2. This was true whether the mixed effect analysis allowed for stochastic intercepts or stochastic slope coefficients.

Discussion

To date, most empirical studies on income inequality and health have been carried out in high- and middle-income

countries. The present study contributes to the growing literature examining the RD hypothesis in poor settings, and indicates that RD is associated with poor health even in the context of a refugee camp. With refugee camp of residence as the reference group, RD is associated with worse health among Palestinian refugee women in Lebanon. Specifically, our findings can be read to mean that two women who share similar absolute SES will report significantly different levels of health if they live in camps that have different degrees of inequality. These findings are robust and consistent irrespective of what absolute SES measure we adjust for. They hold true whether the health outcome is SRH or self-reported chronic conditions.

The results of this study concur with those shown in the literature on RD and SRH in general, but are more similar in their magnitude to those revealed by research in the U.S. and Costa Rica (Kennedy et al., 1998; Modrek et al., 2012). Mackenbach proposed that the lack of or weak association between RD and health in European welfare states may be due to the buffering effect of the welfare system and universal access to health care services (Mackenbach, 2002). Our findings, on the other hand, show that having access to UNRWA primary health care services does not attenuate the deleterious effects of RD on the health of Palestinian women in Lebanon. Indeed, after adjusting for absolute SES, as measured by total household expenditures, RD still associates with SRH in the poor setting of the refugee camp. One explanation for this could lie in the health care system; although UNRWA services are available, they may not be of good quality or may not be optimally utilized. Another explanation perhaps rests in the social and economic conditions themselves. One can argue that universal access to primary health care services may attenuate the deleterious effects of inequality in a European country and where poverty remains below a threshold, but not under the extremely exclusionary structural conditions in which Palestinians live in Lebanon.

One of the main findings of our study is that the association between RD and SRH persists after adjusting for self-reported chronic conditions. As accounting for one of the important determinants of SRH does not explain away the association between RD and subjective health status (Idler & Benyamini, 1997), we argue that this association may be operating through a psychosocial pathway (Kawachi & Kennedy, 1999; Marmot & Wilkinson, 2001; Walker & Smith, 2002). This interpretation is only speculative, however, and could only be confirmed if measures of social comparison or distress were included in the analysis. Of relevance to this finding, we note that the relationship between RD, as one of the psychosocial pathways between income inequality and health, and the structural causes of inequalities has been the subject of debate. Whereas some researchers advanced the importance of psychosocial factors as powerful explanations for health inequalities in high-income countries (Marmot & Wilkinson, 2001), others argued that these factors cannot be examined outside the material conditions that determine the day-to-day experiences of people who live in poverty (Lynch, Smith, Kaplan, & House, 2000).

We lean towards the latter view and maintain that the relationship between RD and health in the case of Palestinian refugee women in Lebanon has to be recognized within the broader structural causes of both poverty and inequality. In a context where half of Palestinian workers earn less than the Lebanese minimum wage, the equivalent of $500 per month (ILO, 2012), RD ought to be understood as one of the pathways operating within a broader context of deprivation. As Lynch and colleagues have warned (Lynch et al., 2000), a decontextualized focus on the psychosocial consequences of income inequality on health may lead to advocating for “community therapy” or other regressive policies that entrench victim-blaming and sway the attention away from the need for structural change. As such, we strongly caution against interpretations of our study findings on Palestinian women that focus solely on the psychosocial consequences of inequality on health. Instead, RD as a psychosocial pathway has to be couched within an understanding of long-standing and persistent structural conditions that serve to maintain both poverty and inequality in Palestinian refugee communities in Lebanon.

Our study has limitations that are worth mentioning. First, our findings are constrained by the cross-sectional nature of the data utilized, which restricts us from making any conclusions about causality. Another limitation of the study is our inability to use the income variable for SES due to missing data. This means that, in attempting to place our findings within the broader literature, it should be noted that most studies on the relationship between RD and health use income in calculating the Yitzhaki index. The comparison of our results to the general literature is therefore qualitative and only valid to the extent that we believe that income and expenditures are both proxies for SES. Finally, the use of secondary data that does not include a measure of distress or other psychological measures means that our conclusion about RD as a psychosocial pathway remains speculative. Despite these limitations, the present study contributes to the broad literature in revealing that the independent association between RD and health is not limited to high income settings, but equally holds in a context of poverty and exclusion.

Acknowledgements, competing interests, and funding

We thank the United Nations Relief and Works Agency (UNRWA) for making data from the Socioeconomic Survey of Palestine Refugees in Lebanon available for academic research. The authors declare no competing interests.

Appendix tables

Wavel.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.94	0.97
Chronic conditions	0.63	0.48
Household exp/cap	305.16	182.61
Non-health exp/cap	276.88	165.12
Non-food exp/cap	240.14	144.80
Wealth (asset) index (0–4)	2.03	0.81
Relative deprivation (non-health exp)	0.52	0.32

Relative deprivation (non-food)	0.43	0.32
Age	54.83	16.04
Education	3.69	2.42
Household size	4.46	2.18

Buss.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	3.17	0.83
Chronic conditions	0.51	0.51
Household exp/cap	225.19	119.03
Non-health exp/cap	196.65	111.35
Non-food exp/cap	172.52	99.89
Wealth (asset) index (0–4)	2.10	0.38
Relative deprivation (non-health exp)	0.37	0.26
Relative deprivation (non-food)	0.32	0.26
Age	58.02	15.69
Education	4	2.43
Household size	5.05	2.11

Bourj el Shamali.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.66	1.01
Chronic conditions	0.62	0.51
Household exp/cap	245.02	129.68
Non-health exp/cap	223.81	118.30
Non-food exp/cap	183.73	107.43
Wealth (asset) index (0–4)	2	0.51
Relative deprivation (non-health exp)	0.33	0.25
Relative deprivation (non-food)	0.34	0.25
Age	51.84	13.90
Education	3.66	2.11
Household size	4.96	2.11

Rashidiyeh.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.87	0.86
Chronic conditions	0.51	0.49
Household exp/cap	216.92	105.68
Non-health exp/cap	197.48	92.78
Non-food exp/cap	159.12	87.49
Wealth (asset) index (0–4)	1.99	0.37
Relative deprivation (non-health exp)	0.31	0.25
Relative deprivation (non-food)	0.37	0.25
Age	52.50	15.85
Education	3.42	2.09
Household size	4.61	2.21

Ein el Helweh.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.90	0.87
Chronic conditions	0.54	0.44
Household exp/cap	209.28	144.58
Non-health exp/cap	184.02	109.64

Non-food exp/cap	144.40	112.84
Wealth (asset) index (0–4)	2.13	0.58
Relative deprivation (non-health exp)	0.35	0.29
Relative deprivation (non-food)	0.41	0.29
Age	53.23	14.85
Education	3.56	2.18
Household size	4.38	2.18

Miyeh Miyeh.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	3.29	1.11
Chronic conditions	0.29	0.45
Household exp/cap	202.83	159.36
Non-health exp/cap	162.54	86.63
Non-food exp/cap	134.65	93.64
Wealth (asset) index (0–4)	2.18	0.74
Relative deprivation (non-health exp)	0.32	0.25
Relative deprivation (non-food)	0.40	0.25
Age	51.06	15.05
Education	4.29	2.84
Household size	4.53	2.14

Bourj el Barajneh.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.99	0.89
Chronic conditions	0.58	0.44
Household exp/cap	243.80	126.48
Non-health exp/cap	221.79	112.97
Non-food exp/cap	177.20	103.64
Wealth (asset) index (0–4)	2.33	0.63
Relative deprivation (non-health exp)	0.38	0.26
Relative deprivation (non-food)	0.40	0.26
Age	51.06	13.51
Education	3.83	2.49
Household size	3.31	21.42

Shatila.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.81	1.06
Chronic conditions	0.52	0.50
Household exp/cap	230.81	108.24
Non-health exp/cap	217.47	105.23
Non-food exp/cap	172.38	82.68
Wealth (asset) index (0–4)	2.19	0.56
Relative deprivation (non-health exp)	0.34	0.17
Relative deprivation (non-food)	0.41	0.22
Age	48.68	16.09
Education	3.16	1.39
Household size	4.74	2.00

Mar Elias.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	3.14	1.06

Chronic conditions	0.43	0.53
Household exp/cap	257.40	82.71
Non-health exp/cap	205.58	70.27
Non-food exp/cap	213.69	93.08
Wealth (asset) index (0–4)	2.28	0.48
Relative deprivation (non-health exp)	0.20	0.18
Relative deprivation (non-food)	0.49	0.32
Age	53.28	15.16
Education	5.43	3.41
Household size	4.86	1.67

Dbayeh.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	2.61	0.87
Chronic conditions	0.92	0.29
Household exp/cap	351.68	139.14
Non-health exp/cap	311.24	131.85
Non-food exp/cap	270.15	111.12
Wealth (asset) index (0–4)	2.38	0.50
Relative deprivation (non-health exp)	0.58	0.32
Relative deprivation (non-food)	0.43	0.26
Age	62.77	13.42
Education	2.46	1.27
Household size	3.46	1.77

Nahr el Bared.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	3.09	1.05
Chronic conditions	0.40	0.52
Household exp/cap	226.89	114.73
Non-health exp/cap	214.87	105.78
Non-food exp/cap	163.06	90.29
Wealth (asset) index (0–4)	1.70	0.52
Relative deprivation (non-health exp)	0.34	0.21
Relative deprivation (non-food)	0.45	0.32
Age	47.02	16.43
Education	3.89	19.17
Household size	4.49	2.22

Beddawi.

	Mean	Standard deviation
Self-rated health (1: very good–5: very bad)	3.11	1.03
Chronic conditions	0.37	0.46
Household exp/cap	200.97	140.44
Non-health exp/cap	186.22	113.54
Non-food exp/cap	141.58	121.66
Wealth (asset) index (0–4)	2.07	0.57
Relative deprivation (non-health exp)	0.32	0.23
Relative deprivation (non-food)	0.42	0.23
Age	47.4	14.54
Education	3.59	2.06
Household size	4.65	1.14

Correlation matrix between measures of absolute SES and RD.

	reldep	reldepnfd	reldepwlth	nonhealthexp	nonfoodexp	assets
reldep	1.0000					
reldepnfd	0.0062	1.0000				
reldepwlth	−0.0368	0.0592	1.0000			
nonhealthexp	−0.7995	−0.0046	−0.0029	1.0000		
nonfoodexp	−0.6902	−0.0088	0.0097	0.9076	1.0000	
assets	−0.0475	−0.0265	−0.0333	0.0683	0.0740	1.0000

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